What is claimed is:

1. An illumination apparatus for a microscope, comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into a plurality of beams of irradiation light;

wavelength-selective means provided on optical paths of illumination light split by the beam splitting means to select wavelengths of the illumination light, and

beam synthesizing mean synthesizing the plurality of beams of irradiation light whose wavelengths are selected, into a single light beam.

2. An illumination apparatus for a microscope, comprising:

a light source for white light,

beam splitting means splitting a light beam emitted from the light source into beams of first irradiation light and second irradiation light;

first wavelength-selective means selecting a wavelength of the first irradiation light;

second wavelength-selective means selecting a wavelength of the second irradiation light; and

beam synthesizing means synthesizing the beams of the first irradiation light whose wavelength is selected and the second irradiation light whose wavelength is selected, into a single light beam.

3. An illumination apparatus for a microscope, comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into a plurality of beams of irradiation light;

wavelength-selective means provided on optical paths of illumination light split

by the beam splitting means to select wavelengths of the illumination light;

beam synthesizing mean synthesizing the plurality of beams of irradiation light whose wavelengths are selected, into a single light beam;

a mirror introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated and transmitting light from the specimen;

an objective lens interposed between the mirror and the specimen;

imaging elements imaging fluorescent light from the specimen passing through the objective lens and the mirror, after being separated into fluorescent light excited by individual wavelengths; and

image processing means processing fluorescent images formed by the imaging elements.

4. An image processing apparatus using an illumination apparatus, the illumination apparatus comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into a plurality of beams of irradiation light;

wavelength-selective means provided on optical paths of illumination light split by the beam splitting means to select wavelengths of the illumination light;

beam synthesizing mean synthesizing the plurality of beams of irradiation light whose wavelengths are selected, into a single light beam;

a mirror introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated and transmitting light from the specimen;

an objective lens interposed between the mirror and the specimen;

imaging elements imaging fluorescent light from the specimen passing through the objective lens and the mirror, after being separated into fluorescent light excited

by individual wavelengths; and

image processing means processing fluorescent images formed by the imaging elements.

5. An illumination apparatus for a microscope, comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into two beams of first irradiation light and second irradiation light;

first wavelength-selective means selecting a wavelength of the first irradiation light,

second wavelength-selective means selecting a wavelength of the second irradiation light,

beam synthesizing means synthesizing the beams of the first irradiation light whose wavelength is selected and the second irradiation light whose wavelength is selected, into a single light beam;

a mirror introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated and transmitting light from the specimen;

an objective lens interposed between the mirror and the specimen;

imaging elements imaging fluorescent light from the specimen passing through the objective lens and the mirror, after being separated into fluorescent light excited by a first wavelength and fluorescent light excited by a second wavelength and forming an image; and

image processing means processing fluorescent images formed by the imaging element.

6. An image processing apparatus using an illumination apparatus, the illumination apparatus comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into two beams of first irradiation light and second irradiation light;

first wavelength-selective means selecting a wavelength of the first irradiation light,

second wavelength-selective means selecting a wavelength of the second irradiation light,

beam synthesizing means synthesizing the beams of the first irradiation light whose wavelength is selected and the second irradiation light whose wavelength is selected, into a single light beam;

a mirror introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated and transmitting light from the specimen;

an objective lens interposed between the mirror and the specimen;

imaging elements imaging fluorescent light from the specimen passing through the objective lens and the mirror, after being separated into fluorescent light excited by a first wavelength and fluorescent light excited by a second wavelength and forming an image; and

image processing means processing fluorescent images formed by the imaging element.

7. An illumination apparatus for a microscope, comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into a plurality of beams of irradiation light,

wavelength-selective means provided on optical paths of illumination light split by the beam splitting means to select wavelengths of the illumination light;

beam synthesizing mean synthesizing the plurality of beams of irradiation light

whose wavelengths are selected, into a single light beam;

a first objective lens introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated;

a second objective lens placed opposite to the first objective lens, with the specimen between the first objective lens and the second objective lens;

imaging elements imaging fluorescent light from the specimen passing through the second objective lens, after being separated into fluorescent light excited by individual wavelengths, and

image processing means processing fluorescent images formed by the imaging elements.

8. An image processing apparatus using an illumination apparatus, the illumination apparatus comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into a plurality of beams of irradiation light,

wavelength-selective means provided on optical paths of illumination light split by the beam splitting means to select wavelengths of the illumination light;

beam synthesizing mean synthesizing the plurality of beams of irradiation light whose wavelengths are selected, into a single light beam;

a first objective lens introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated;

a second objective lens placed opposite to the first objective lens, with the specimen between the first objective lens and the second objective lens;

imaging elements imaging fluorescent light from the specimen passing through the second objective lens, after being separated into fluorescent light excited by individual wavelengths, and

image processing means processing fluorescent images formed by the imaging

elements.

9. An illumination apparatus for a microscope, comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into beams of first irradiation light and second irradiation light;

first wavelength-selective means selecting a wavelength of the first irradiation light;

second wavelength-selective means selecting a wavelength of the second irradiation light;

beam synthesizing means synthesizing the beams of the first irradiation light whose wavelength is selected and the second irradiation light whose wavelength is selected, into a single light beam;

a first objective lens introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated;

a second objective lens placed opposite to the first objective lens, with the specimen between the first objective lens and the second objective lens;

imaging elements imaging fluorescent light from the specimen passing through the second objective lens, after being separated into fluorescent light excited by a first wavelength and fluorescent light excited by a second wavelength; and

image processing means processing fluorescent images formed by the imaging elements.

10. An image processing apparatus using an illumination apparatus, the illumination apparatus comprising:

a light source for white light;

beam splitting means splitting a light beam emitted from the light source into beams of first irradiation light and second irradiation light;

first wavelength-selective means selecting a wavelength of the first irradiation light;

second wavelength-selective means selecting a wavelength of the second irradiation light;

beam synthesizing means synthesizing the beams of the first irradiation light whose wavelength is selected and the second irradiation light whose wavelength is selected, into a single light beam;

a first objective lens introducing the light beam synthesized by the beam synthesizing means in a direction in which a specimen is irradiated;

a second objective lens placed opposite to the first objective lens, with the specimen between the first objective lens and the second objective lens;

imaging elements imaging fluorescent light from the specimen passing through the second objective lens, after being separated into fluorescent light excited by a first wavelength and fluorescent light excited by a second wavelength; and

image processing means processing fluorescent images formed by the imaging elements.

11. An illumination apparatus for a microscope according to claim 3 or 7, further comprising light-amount adjusting means adjusting an intensity of at least one of the plurality of beams of irradiation light.

12. An image processing apparatus according to claim 4 or 8, wherein the illumination apparatus further comprises light-amount adjusting means adjusting an intensity of at least one of the plurality of beams of irradiation light.

13. An illumination apparatus for a microscope according to claim 5 or 9, further comprising both first light-amount adjusting means adjusting an intensity of the first irradiation light and second light-amount adjusting means adjusting an intensity of

the second irradiation light, or one of the first light-amount adjusting means and the second light-amount adjusting means.

14. An image processing apparatus according to claim 6 or 10, wherein the illumination apparatus further comprises both first light-amount adjusting means adjusting an intensity of the first irradiation light and second light-amount adjusting means adjusting an intensity of the second irradiation light, or one of the first light-amount adjusting means and the second light-amount adjusting means.

15. An illumination apparatus for a microscope according to claim 3 or 7, further comprising polarization direction selective means selecting a polarization direction of at least one of the plurality of beams of irradiation light.

16. An image processing apparatus according to claim 4 or 8, wherein the illumination apparatus further comprises polarization direction selective means selecting a polarization direction of at least one of the plurality of beams of irradiation light.

17. An illumination apparatus for a microscope according to claim 5 or 9, further comprising both first polarization direction selective means selecting a polarization direction of the first irradiation light and second polarization direction selective means selecting a polarization direction of the second irradiation light, or one of the first polarization direction selective means and the second polarization direction selective means.

18. An image processing apparatus according to claim 7 or 10, wherein the illumination apparatus further comprises both first polarization direction selective means selecting a polarization direction of the first irradiation light and second polarization direction selective means selecting a polarization direction of the second irradiation

light, or one of the first polarization direction selective means and the second polarization direction selective means.

19. An illumination apparatus for a microscope according to claim 3 or 7, further comprising wavelength distribution monitoring means monitoring a wavelength distribution of at least one of the plurality of beams of irradiation light.

20. An image processing apparatus according to claim 4 or 8, wherein the illumination apparatus further comprises wavelength distribution monitoring means monitoring a wavelength distribution of at least one of the plurality of beams of irradiation light.

21. An illumination apparatus for a microscope according to claim 5 or 9, further comprising wavelength distribution monitoring means monitoring both a wavelength distribution of the first irradiation light and a wavelength distribution of the second irradiation light, or one of the wavelength distribution of the first irradiation light and the wavelength distribution of the second irradiation light.

22. An image processing apparatus according to claim 6 or 10, wherein the illumination apparatus further comprises wavelength distribution monitoring means monitoring both a wavelength distribution of the first irradiation light and a wavelength distribution of the second irradiation light, or one of the wavelength distribution of the first irradiation light and the wavelength distribution of the second irradiation light.

23. An illumination apparatus for a microscope according to claim 3 or 5, wherein the mirror is a semi-transmissive mirror.

24. An image processing apparatus according to claim 4 or 6, wherein the mirror is a semi-transmissive mirror.

25. An illumination apparatus for a microscope according to any one of claim 3, 5, 7, or 9, wherein the beam splitting means and the beam synthesizing means are dichroic mirrors.

26. An image processing apparatus according to any one of claim 4, 6, 8, or 10, wherein the beam splitting means and the beam synthesizing means are dichroic mirrors.

27. An illumination apparatus for a microscope according to any one of claim 3, 5, 7, or 9, wherein the beam splitting means and the beam synthesizing means are polarization beam splitters.

28. An image processing apparatus according to any one of claim 4, 6, 8, or 10, wherein the beam splitting means and the beam synthesizing means are polarization beam splitters.

29. An illumination apparatus for a microscope according to claim 3 or 7, wherein at least one of a plurality of wavelength-selective means is placed to be movable in and out of an optical path split by the beam splitting means.

30. An image processing apparatus according to claim 4 or 8, wherein at least one of a plurality of wavelength-selective means is placed to be movable in and out of an optical path split by the beam splitting means.

31. An illumination apparatus for a microscope according to claim 5 or 9, wherein at least one of the first wavelength-selective means and the second wavelength-selective means is placed to be movable in and out of an optical path split by the beam splitting means.

32. An image processing apparatus according to claim 6 or 10, wherein at least one of the first wavelength-selective means and the second wavelength-selective means is placed to be movable in and out of an optical path split by the beam splitting means.